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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicants	:	Phillip B. Blankenship et al.
Serial No.	:	09/893,314
Filing Date	:	June 27, 2001
Title	:	METHOD FOR SELECTING AN ASPHALT MIXTURE FOR MAKING AN INTERLAYER AND METHOD OF MAKING AN INTERLAYER
Group/Art Unit	:	1762
Examiner	:	Eric B. Fuller
Confirmation No.	:	2106
Atty. Docket No.	:	506422.0047

Mail Stop Appeal Brief - Patents
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APPEAL BRIEF

In accordance with the provisions of 37 C.F.R. §41.37, Applicant submits this Appeal Brief in support of the Notice of Appeal filed on February 15, 2005.

I. REAL PARTY IN INTEREST

The owner of this application is KMC Enterprises, Inc., 4111 East 37th Street North, Wichita, Kansas, 67201.

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II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

This application was filed on June 27, 2001 with 33 claims. Claims 34, 35 and 36 were added in a Preliminary Amendment filed April 10, 2002. Subsequently, claims 1-18 have been withdrawn and then cancelled, claims 19-36 have been cancelled and claims 37- 59 have been added. Claims 37-59 remain pending in this application. Claims 37-59 stand finally rejected. The claims involved in this appeal are claims 37-59, which are reproduced in Appendix A attached hereto.

IV. STATUS OF AMENDMENTS

No amendments were filed subsequent to final rejection. Accordingly, all amendments to be considered on appeal have been entered. The claims on appeal are reproduced in Appendix A to this brief in accordance with the amendments made to the claims as originally filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 37 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. A stability test and a fatigue test are performed on at least one

asphalt mixture that includes a polymer-modified binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer.[1]

Independent claim 45 is directed to a method of reconstructing a roadway. A stability test and a fatigue test are performed on at least one asphalt mixture that includes a polymer-modified binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture is applied as an interlayer to a roadway. Using traffic levels, the desired thickness of an overlay to be applied to the interlayer is determined, and then an overlay of a desired thickness is applied to the interlayer.[2]

Independent claim 55 is directed to a method of making an interlayer for a roadway. An asphalt mixture made from polymer-modified asphalt binder and aggregate is formed. This asphalt mixture has a Hveem stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C. An interlayer for a roadway is then formed from this asphalt mixture.[3]

Independent claim 57 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. A ductility test is performed on at least one polymer-modified binder. Based on the results of this ductility test, a binder is selected for making an asphalt mixture. A stability test and a fatigue test are performed on at least one asphalt mixture that

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[1] The subject matter of claim 37 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 13, line 11; and page 14, lines 1-13 and 21-24.

[2] The subject matter of claim 45 is described on page 3, lines 7-9; page 4, lines 1-9 and 16-17; page 13, line 11; page 14, lines 1-13 and 21-24; page 15, lines 5-8; page 16, lines 11-23; and page 21, lines 4-7.

[3] The subject matter of claim 55 is described on page 3, lines 7-9; page 4, lines 1-9 and 16-17; page 13, lines 16-26; page 14, lines 10-20; and page 15, lines 5-6.

includes the selected binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer.[4]

Dependent claim 38 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. A Hveem stability test and a fatigue test are performed on at least one asphalt mixture. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture has a Hveem stability at 60°C and 50 gyrations of at least about 18.[5]

Dependent claim 39 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. A stability test and a Flexural Beam Fatigue test are performed on at least one asphalt mixture. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture has a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C.[6]

Dependent claim 42 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. The shear modulus, strain tolerance, and the bending creep stiffness of at least one polymer-modified binder are determined. Based on these measurements, a binder is selected for making an asphalt mixture. A stability test and a fatigue test are performed on at

[4] The subject matter of claim 57 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 5, lines 13-19; page 13, line 11; and page 14, lines 1-13 and 21-24.

[5] The subject matter of claim 38 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 13, lines 11-26; and page 14, lines 1-13 and 21-24.

[6] The subject matter of claim 39 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 13, line 11; and page 14, lines 1-24.

least one asphalt mixture that includes the selected binder. Based on the results of these tests, an asphalt mixture is selected for making an interlayer.[7]

Dependent claim 43 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. The rotational viscosity of at least one polymer-modified binder is determined. Based on the rotational viscosity measurement, a binder is selected for making an asphalt mixture. A stability test and a fatigue test are performed on at least one asphalt mixture that includes the selected binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer.[8]

Dependent claim 44 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. Volumetric testing, a stability test and a fatigue test are performed on at least one asphalt mixture. Based on the results of these tests, an asphalt mixture is selected for making an interlayer.[9]

Dependent claim 46 is directed to a method of reconstructing a roadway. A stability test and a fatigue test are performed on at least one asphalt mixture that includes a polymer-modified binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture is applied as an interlayer to a roadway at a temperature above about 140°F. Using traffic levels, the desired thickness of an overlay to be

[7] The subject matter of claim 42 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 5, lines 6-35; page 13, line 11; and page 14, lines 1-13 and 21-24.

[8] The subject matter of claim 43 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 5, lines 3-5; page 9, lines 4-10; page 13, line 11; and page 14, lines 1-13 and 21-24.

[9] The subject matter of claim 44 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 12, lines 15-20; page 13, line 11; and page 14, lines 1-13 and 21-24.

applied to the interlayer is determined. Then an overlay of a desired thickness is applied to the interlayer once it has cooled to below about 140°F.[10]

Dependent claim 48 is directed to a method of reconstructing a roadway. A stability test and a fatigue test are performed on at least one asphalt mixture that includes a polymer-modified binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The roadway to be reconstructed is swept, and cracks in the roadway are sealed. Once the roadway is swept and cracks are sealed, the selected asphalt mixture is applied as an interlayer to the roadway. Using traffic levels, the desired thickness of an overlay to be applied to the interlayer is determined, and then an overlay of a desired thickness is applied to the interlayer.[11]

Dependent claim 53 is directed to a method of reconstructing a roadway. Volumetric testing, a stability test, and a fatigue test are performed on at least one asphalt mixture that includes a polymer-modified binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture is applied as an interlayer to a roadway. Using traffic levels, the desired thickness of an overlay to be applied to the interlayer is determined, and then an overlay of a desired thickness is applied to the interlayer.[12]

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[10] The subject matter of claim 46 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 13, line 11; page 14, lines 1-13 and 21-24; and page 15, lines 9-25.

[11] The subject matter of claim 48 is described on page 3, lines 7-9; page 4, lines 1-9 and 16-17; page 13, line 11; page 14, lines 1-13 and 21-24; page 15, lines 5-8; page 16, lines 11-23; and page 21, lines 4-7.

[12] The subject matter of claim 53 is described on page 3, lines 7-9; page 4, lines 1-9 and 16-17; page 12, lines 15-20; page 13, line 11; page 14, lines 1-13 and 21-24; page 15, lines 5-8; page 16, lines 11-23; and page 21, lines 4-7.

Dependent claim 54 is directed to a method of reconstructing a roadway. A stability test and a fatigue test are performed on at least one asphalt mixture that includes a polymer-modified binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture is applied as an interlayer to a roadway. Traffic is allowed to drive on the interlayer before applying an overlay once the interlayer has cooled to below about 140°F. Using traffic levels, the desired thickness of an overlay to be applied to the interlayer is determined, and then an overlay of a desired thickness is applied to the interlayer.[13]

Dependent claim 56 is directed to a method of making an interlayer for a roadway. A polymer-modified asphalt binder having a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate, when using straight-sided molds and aggregate are included to form an asphalt mixture. This asphalt mixture has a Hveem stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C. An interlayer for a roadway is then formed from this asphalt mixture.[14]

Dependent claim 58 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. A ductility test is performed on at least one polymer-modified binder. Based on the results of this ductility test, a binder is selected for making an asphalt mixture, and this selected binder has a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate, when using straight-sided molds. A stability test and a fatigue test are performed on

[13] The subject matter of claim 54 is described on page 3, lines 7-9; page 4, lines 1-9 and 16-17; page 13, line 11; page 14, lines 1-13 and 21-24; page 15, lines 5-8; page 16, lines 10-23; and page 21, lines 4-7.

[14] The subject matter of claim 56 is described on page 3, lines 7-9; page 4, lines 1-9 and 16-17; page 5, line 13 through page 6, line 35; page 13, lines 16-26; page 14, lines 10-20; and page 15, lines 5-6.

at least one asphalt mixture that includes the selected binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer.[15]

Dependent claim 59 is directed to a method of selecting an asphalt mixture for making an interlayer for a roadway. A ductility test is performed on at least one polymer-modified binder. Based on the results of this ductility test, a binder is selected for making an asphalt mixture, and this selected binder has a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate, when using straight-sided molds. A stability test and a fatigue test are performed on at least one asphalt mixture that includes the selected binder and aggregate. Based on the results of these tests, an asphalt mixture is selected for making an interlayer. The selected asphalt mixture has a Hveem stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C.[16]

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejections presented for review are as follows:

A. Claims 37-47 and 49-59 stand rejected under 35 U.S.C. §103 as being unpatentable over the combination of U.S. Patent No. 6,248,396 to Helf in view of U.S. Patent No. 3,907,582 to Walter and U.S. Patent No. 5,306,750 to Goodrich et al.

B. Claim 48 stands rejected under 35 U.S.C. §103 as being unpatentable over the combination of U.S. Patent No. 6,248,396 to Helf in view of U.S. Patent No. 3,907,582 to Walter

[15] The subject matter of claim 58 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 5, line 13 through page 6, line 35; page 13, line 11; and page 14, lines 1-13 and 21-24.

[16] The subject matter of claim 59 is described on page 3, lines 7-9; page 4, lines 8-9 and 16-17; page 5, line 13 through page 6, line 35; page 13, lines 11 and 16-26; and page 14, lines 1-24.

and U.S. Patent No. 5,306,750 to Goodrich and further in view of U.S. Patent No. 3,891,585 to McDonald.

VII. ARGUMENT

As the standard for assessing obviousness, MPEP 706.02(j) lists three requirements for establishing a *prima facie* case of obviousness under 35 U.S.C. § 103:

(1) First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the references to arrive at the claimed invention.

(2) Second, there must be a reasonable expectation of success.

(3) Finally, the prior art references must teach or suggest all of the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicant's disclosure.

It is respectfully submitted that these three requirements have not been met. For the reasons discussed in further detail below, Applicant respectfully submits that a *prima facie* case of obviousness for rejecting pending claims 37-59 has not been established. Claims 37-59 are not anticipated or made obvious by Helf in view of Walter and Goodrich. Still further, even if these references are combined with McDonald, claims 37-59 are not anticipated or made obvious.

A. A *PRIMA FACIE* CASE OF OBVIOUSNESS BASED ON HELF IN VIEW OF WALTER AND GOODRICH IS LACKING

1. Claims 37, 40, and 41

U.S. Patent No. 6,248,396 to Helf (Helf) in view of U.S. Patent No. 3,907,582 to Walter (Walter) and U.S. Patent No. 5,306,750 to Goodrich et al. (Goodrich) does not disclose or suggest a method of selecting an asphalt mixture for making an interlayer by performing a stability test and fatigue test on at least one asphalt mixture, as claimed in claims 37, 40, and 41. Further, the combination of these references does not disclose or suggest selecting an asphalt mixture for an interlayer based on the stability and fatigue performance of a tested asphalt mixture, as also claimed in claims 37, 40, and 41.

As noted by the Examiner, the primary reference, Helf, fails to teach or suggest performing a stability test or a fatigue test. Walter is cited for teaching that stability tests have been performed.[17] Goodrich is cited for teaching that fatigue tests have been performed.[18] However, neither Walter nor Goodrich suggests the desirability of performing both stability and fatigue tests on a proposed asphalt mixture before selecting an asphalt mixture for paving, as claimed in claims 37, 40, and 41. Out of the numerous performance tests that could be performed, there is no teaching or suggestion by the cited references of performing a stability **and** a fatigue test. There is no suggestion that an asphalt mixture should be selected after performing stability and fatigue tests, and there is no suggestion that the selection process should

[17] See Walter at column 9, lines 18-33.

[18] See Goodrich at column 11, line 60, through column 12, line 36.

be based on the stability and fatigue performance of a proposed asphalt mixture, as claimed in claims 37, 40, and 41. Goodrich merely performs a fatigue test to verify the properties of his new thermoplastic polymer-linked asphalt.[19] Walter merely performs a Marshall stability test to determine a target asphalt content when adding treated incinerator residue but does not suggest stability testing should be integrated into the formulation process when practicing his invention.[20] In fact, neither Walter nor Goodrich suggests performance testing as a design technique for formulating an asphalt mixture when one actually is practicing what is taught by these references.

In addition, neither Walter nor Goodrich suggests selecting an asphalt mixture for making an interlayer, as also claimed in claims 37, 40, and 41. In fact, neither Walter nor Goodrich even suggests making an interlayer for a roadway, as claimed by Applicant. Walter's teachings are directed to making a base course[21], and Goodrich's teachings are directed generally to paving and roofing applications.[22]

Further, the cited references are not properly combinable. The Helf invention is concerned with a very unique kind of paving material. The paving material of Helf requires a "flexible aggregate", a term defined by Helf.[23] Walter, on the other hand, is concerned with an

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[19] See Goodrich at column 9, lines 12-32, where uses of his polymer-linked-asphalt reaction product are described, and then see column 10, lines 51-55, which describe that the advantages of this reaction product can be seen from the examples below where various physical properties of the product are measured. The properties being measured are not used as part of an iterative design technique for making the invented product.

[20] See Walter at column4, lines 15-50, which describes that "it has unexpectedly been found that incinerator residue, which has a particle size of less than 2 inches... is highly suitable for replacing about 50 percent or more... of the mineral aggregate in asphalt pavement course compositions."

[21] See Walter at column 3, lines 39-46.

[22] See the Abstract of Goodrich.

[23] See Helf at column 5, lines 19-48.

asphalt pavement material containing incinerator residue that exhibits sufficient stability.[24] Walter does not even contemplate using "flexible aggregate" in his paving composition and instead suggests the use of mineral aggregates, such as sand, stone, and/or lime. One reviewing Walter would be motivated to look to other references that teach achieving the same goals, such as improving stability or incorporating incinerator waste. As Helf provides no teaching of testing stability or adding incinerator waste, one looking to improve Walter would have no motivation to look to Helf.

In addition, Goodrich is not concerned with using "flexible aggregate" and in fact does not even mention its use. Instead Goodrich is concerned with making a polymer-modified asphalt that exhibits better performance properties, including a better flexural fatigue life. One trying to improve upon Goodrich would be motivated to look to other references that teach achieving a better flexural fatigue life. As Helf provides no teaching of ways to improve flexural fatigue life, one looking to improve Goodrich would have no motivation to look to Helf.

In addition to the foregoing reasons, neither Walter nor Goodrich would look to Helf to improve its asphalt composition, as both of these references are focused on asphalt compositions and not aggregate composition. Still further, Helf would not look to Walter or Goodrich to improve his "flexible aggregate" invention, as Walter and Goodrich do not even suggest the possibility of using "flexible aggregate" in their paving compositions. Accordingly, there is no motivation from the cited references to modify Helf to suggest Applicant's claimed invention.

In addition, there is no suggestion by Helf or Walter that Walter's base course could be useful in forming Helf's interlayer or surface course, and there is no suggestion by Helf

[24] See Walter at column 3, lines 39-46.

or Goodrich that Goodrich's new asphalt formulation could be useful in forming an interlayer. In fact, Goodrich merely suggests performing a fatigue test to verify the properties of his new chemical formulation and not to design any road layer. Accordingly, there is no motivation to combine Helf, Walter and Goodrich.

Still further, one of ordinary skill in the art would not have a reasonable expectation of success in achieving Applicant's claimed invention from the teachings of the cited references. More specifically, one of ordinary skill in the art would not have a reasonable expectation of success in developing Applicant's claimed method of selecting an asphalt mixture for making interlayer using the teachings of the cited references.

Helf teaches away from the present invention by teaching the use of flexible material, such as vulcanized rubber from recycled tire material, in place of traditional aggregate, which can be sand, rocks or other minerals. In doing this, Helf redefines the term "aggregate" in his patent so that this term is not used with its conventional meaning to one of ordinary skill in the art. Helf has been his own lexicographer and has developed the term "flexible aggregate" to mean rubber pieces put in an asphalt mixture. Traditionally, one of ordinary skill in the art would consider the term "flexible aggregate" an oxymoron because aggregate is **not** flexible.

By teaching that an interlayer be made with "flexible aggregate", Helf teaches away from making an interlayer, such as Applicant's interlayer, from merely aggregate in the word's ordinary meaning, namely, rocks, sand or other minerals. This difference is significant. When using substantial amounts of rubber pieces in place of aggregate, an asphalt slurry is created rather than creating a paving layer with good load bearing capacity. One concerned with the stability of the interlayer being created would not look to a reference, such as Helf, that teaches making a slurry.

In addition, Helf teaches away from the present invention by teaching that the same design procedure can be used to make an interlayer or a surface course.[25] By teaching that the designs of an interlayer and a surface course are interchangeable, Helf suggests that there are not specific performance characteristics, such as stability and fatigue, that one might want to use to develop an interlayer but not a surface course. In fact, none of the cited references teaches designing an asphalt mixture specifically for an interlayer, as done by Applicant. By formulating an asphalt mixture that is specifically for an interlayer, a better design that meets the needs of an interlayer can be made.

The claimed invention is specific to selecting an asphalt mixture for creating an **interlayer** and is not for making other layers of a paved road. One of ordinary skill in the art would have no expectation of making a successful interlayer based on performance tests when no cited reference teaches characteristics that are specific to only an interlayer. The way the asphalt mixture for the interlayer is selected is a key part of Applicant's invention. By using stability and fatigue performance to select an asphalt mixture for making an interlayer, a better interlayer can be created.[26] For the foregoing reasons, one of ordinary skill in the art would not have a reasonable expectation of successfully achieving Applicant's claimed invention from the teachings and suggestions in the cited references.

For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claims 37, 40 and 41 has not been established.[27]

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[25] See Helf at column 2, lines 8-32, which describes paving a surface or forming a stress absorbing layer with the invented asphalt composition.

[26] See the Blankenship Declaration in Appendix B.

[27] *See In re Bell*, 26 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1993)(quoting *In re Rinehart*, 189 U.S.P.Q. 143,147 (C.C.P.A. 1976)) (finding that the Patent Office's burden of establishing a *prima facie* case of obviousness is not met unless "the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.").

2. Claim 38

In addition to being novel and non-obvious over the cited references for the same reasons that claim 37 is novel and non-obvious, claim 38 provides additional grounds for patentability. Helf in combination with Walter and Goodrich does not disclose or suggest the particular minimum stability claimed by Applicant in claim 38, namely, a Hveem stability at 60°C and 50 gyrations of at least about 18. In fact, Walter, the reference cited for teaching a stability test, teaches that higher stability values are desirable but does not teach a minimum stability necessary for an interlayer, as claimed in claim 38. None of the cited references teach or suggest a Hveem stability of at least about 18. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 38 has not been established.

3. Claim 39

In addition to being novel and non-obvious over the cited references for the same reasons that claim 37 is novel and non-obvious, claim 39 provides additional grounds for patentability. The combination of Helf in view of Walter and Goodrich does not disclose or suggest selecting an asphalt mixture for making an interlayer that has a Flexural Beam Fatigue of at least about 100,000 cycles at 200 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C, as claimed in claim 39. The only reference that is cited to suggest testing fatigue, Goodrich, does not teach or suggest fatigue values of at least about 100,000 cycles at 2000 microstrains. In fact, Goodrich does not suggest a fatigue value of more that 20,000 when only at 1000 microstrains. Accordingly, none of the cited references teach or suggest selecting an asphalt mixture with the claimed Flexural Beam Fatigue. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 39 has not been established.

4. Claim 42

In addition to being novel and non-obvious over the cited references for the same reasons that claim 37 is novel and non-obvious, claim 42 provides additional grounds for patentability. The combination of Helf, Walter, and Goodrich does not disclose or suggest determining the sheer modulus, strain tolerance **and** bending creep stiffness of at least one polymer-modified binder and then selecting a binder for making an asphalt mixture after performing and **based on these three measurements**, as claimed in claim 42. Goodrich teaches measuring numerous physical properties his invented polymer-linked-asphalt reaction product in his examples to show the physical properties of his product but does not suggest formulating his reaction product based on shear modulus, strain tolerance and bending creep stiffness measurements. In contrast, Applicant's claimed three performance tests aid in selecting a desirable binder. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 42 has not been established.

5. Claim 43

In addition to being novel and non-obvious over the cited references for the same reasons that claim 37 is novel and non-obvious, claim 43 provides additional grounds for patentability. The combination of Helf, Walter and Goodrich does not disclose or suggest determining the rotational viscosity of at least one polymer-modified binder and then selecting a binder for making an asphalt mixture after performing and **based on the rotational viscosity measurement**, as claimed in claim 43. Goodrich teaches measuring numerous physical properties his invented polymer-linked-asphalt reaction product in his examples to show the physical properties of his product but does not suggest formulating his reaction product based on a rotational viscosity measurement. In contrast, Applicant is measuring rotational viscosity so as

to help in the selection of a desirable binder for making an interlayer. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 43 has not been established.

6. Claim 44

In addition to being novel and non-obvious over the cited references for the same reasons that claim 37 is novel and non-obvious, claim 44 provides additional grounds for patentability. The combination of Helf, Walter and Goodrich does not disclose or suggest performing volumetric testing on a proposed asphalt mixture and then selecting the asphalt mixture for the interlayer after performing and based on volumetric performance of the proposed asphalt mixture, as claimed in claim 44. Further, the cited references alone or in combination do not disclose or suggest **volumetric testing, stability testing, and fatigue testing** a proposed asphalt mixture so as to aid in the design process of making an asphalt mixture, as claimed in claim 44. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 44 has not been established.

7. Claims 45, 47, and 49-52

Helf in view of Walter and Goodrich does not disclose or suggest a method of reconstructing a roadway by performing a stability test and a fatigue test on at least one asphalt mixture, as claimed in claims 45, 47, and 49-52. Further, the combination of these references does not disclose or suggest selecting an asphalt mixture for an interlayer based on the stability and fatigue performance of a tested asphalt mixture, as also claimed in claims 45, 47, and 49-52. Still further, the combination of these references does not disclose or suggest applying this

selected asphalt mixture as an interlayer to a roadway followed by applying an overlay of a desired thickness to the interlayer, as also claimed in claims 45, 47, and 49-52.

As discussed previously, Helf fails to teach or suggest performing a stability test or a fatigue test. Walter is cited for teaching that stability tests have been performed.[28] Goodrich is cited for teaching that fatigue tests have been performed.[29] However, neither Walter nor Goodrich suggest the desirability of performing both stability and fatigue tests on a proposed asphalt mixture before selecting an asphalt mixture for making an interlayer so as to reconstruct a road, as claimed in claims 45, 47, and 49-52. Out of the numerous performance tests that could be performed, there is no teaching or suggestion by the cited references of performing a stability **and** a fatigue test. There is no suggestion that an asphalt mixture should be selected after performing stability and fatigue tests, and there is no suggestion that the selection process should be based on the stability and fatigue performance of a proposed asphalt mixture, as claimed in claims 45, 47, and 49-52. Goodrich merely performs a fatigue test to verify the properties of his new thermoplastic polymer-linked asphalt.[30] Walter merely performs a Marshall stability test to determine a target asphalt content when adding treated incinerator residue but does not suggest stability testing should be integrated into the formulation process when practicing his invention.[31] In fact, neither Walter nor Goodrich suggests performance testing as a design

[28] See Walter at column 9, lines 18-33.

[29] See Goodrich at column 11, line 60, through column 12, line 36.

[30] See Goodrich at column 9, lines 12-32, where uses of his polymer-linked-asphalt reaction product are described, and then see column 10, lines 51-55, which describe that the advantages of this reaction product can be seen from the examples below where various physical properties of the product are measured. The properties being measured are not used as part of an iterative design technique for making the invented product.

[31] See Walter at column4, lines 15-50, which describes that "it has unexpectedly been found that incinerator residue, which has a particle size of less than 2 inches... is highly suitable for replacing about 50 percent or more... of the mineral aggregate in asphalt pavement course compositions."

technique for formulating an asphalt mixture when one actually is practicing what is taught by these references.

In addition, neither Walter nor Goodrich suggests selecting an asphalt mixture for making an interlayer, as also claimed in claims 37, 40, and 41. In fact, neither Walter nor Goodrich even suggests making an interlayer for a roadway, as claimed by Applicant. Walter's teachings are directed to making a base course[32], and Goodrich's teachings are directed generally to paving and roofing applications.[33]

Further, the cited references are not properly combinable. The Helf invention is concerned with a very unique kind of paving material. The paving material of Helf requires a "flexible aggregate", a term defined by Helf.[34] Walter, on the other hand, is concerned with an asphalt pavement material containing incinerator residue that exhibits sufficient stability.[35] Walter does not even contemplate using "flexible aggregate" in his paving composition and instead suggests the use of mineral aggregates, such as sand, stone, and/or lime. One reviewing Walter would be motivated to look to other references that teach achieving the same goals, such as improving stability or incorporating incinerator waste. As Helf provides no teaching of testing stability or adding incinerator waste, one looking to improve Walter would have no motivation to look to Helf.

In addition, Goodrich is not concerned with using "flexible aggregate" and in fact does not even mention its use. Instead Goodrich is concerned with making a polymer-modified

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[32] See Walter at column 3, lines 39-46.

[33] See the Abstract of Goodrich.

[34] See Helf at column 5, lines 19-48.

[35] See Walter at column 3, lines 39-46.

asphalt that exhibits better performance properties, including a better flexural fatigue life. One trying to improve upon Goodrich would be motivated to look to other references that teach achieving a better flexural fatigue life. As Helf provides no teaching of ways to improve flexural fatigue life, one looking to improve Goodrich would have no motivation to look to Helf.

In addition to the foregoing reasons, neither Walter nor Goodrich would look to Helf to improve its asphalt composition, as both of these references are focused on asphalt compositions and not aggregate composition. Still further, Helf would not look to Walter or Goodrich to improve his "flexible aggregate" invention, as Walter and Goodrich do not even suggest the possibility of using "flexible aggregate" in their paving compositions. Accordingly, there is no motivation from the cited references to modify Helf to suggest Applicant's claimed invention.

In addition, there is no suggestion by Helf or Walter that Walter's base course could be useful in forming Helf's interlayer or surface course, and there is no suggestion by Helf or Goodrich that Goodrich's new asphalt formulation could be useful in forming an interlayer. In fact, Goodrich merely suggests performing a fatigue test to verify the properties of his new chemical formulation and not to design any road layer. Accordingly, there is no motivation to combine Helf, Walter and Goodrich.

One of ordinary skill in the art would not have a reasonable expectation of success in achieving Applicant's claimed invention from the teachings of the cited references. More specifically, one of ordinary skill in the art would not have a reasonable expectation of success in developing Applicant's claimed method of selecting an asphalt mixture for making interlayer using the teachings of the cited references.

Helf teaches away from the present invention by teaching the use of flexible material, such as vulcanized rubber from recycled tire material, in place of traditional aggregate, which can be sand, rocks or other minerals. In doing this, Helf redefines the term "aggregate" in his patent so that this term is not used with its conventional meaning to one of ordinary skill in the art. Helf has been his own lexicographer and has developed the term "flexible aggregate" to mean rubber pieces put in an asphalt mixture. Traditionally, one of ordinary skill in the art would consider the term "flexible aggregate" an oxymoron because aggregate is **not** flexible.

By teaching that an interlayer be made with "flexible aggregate", Helf teaches away from making an interlayer, such as Applicant's interlayer, from merely aggregate in the word's ordinary meaning, namely, rocks, sand or other minerals. This difference is significant. When using substantial amounts of rubber pieces in place of aggregate, an asphalt slurry is created rather than creating a paving layer with good load bearing capacity. One concerned with the stability of the interlayer being created would not look to a reference, such as Helf, that teaches making a slurry.

In addition, Helf teaches away from the present invention by teaching that the same design procedure can be used to make an interlayer or a surface course.[36] By teaching that the designs of an interlayer and a surface are interchangeable, Helf suggests that there are not specific performance characteristics, such as stability and fatigue, that one might want to use to develop an interlayer but not a surface course. In fact, none of the cited references teaches designing an asphalt mixture specifically for an interlayer, as done by Applicant. By formulating

[36] See Helf at column 2, lines 8-32, which describes paving a surface or forming a stress absorbing layer with the invented asphalt composition.

an asphalt mixture that is specifically for an interlayer, a better design that meets the needs of an interlayer can be made.

The claimed invention is specific to selecting an asphalt mixture for creating an **interlayer** and is not for making other layers of a paved road. One of ordinary skill in the art would have no expectation of making a successful interlayer based on performance tests when no cited reference teaches characteristics that are specific to only an interlayer. The way the asphalt mixture for the interlayer is selected is a key part of Applicant's invention. By using stability and fatigue performance to select an asphalt mixture for making an interlayer, a better interlayer can be created.[37] For the foregoing reasons, one of ordinary skill in the art would not have a reasonable expectation of successfully achieving Applicant's claimed invention from the teachings and suggestions in the cited references.

For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claims 45, 47, and 49-52 has not been established.

8. Claim 46

In addition to being novel and non-obvious over the cited references for the same reasons that claim 45 is novel and non-obvious, claim 46 provides additional grounds for patentability. The combination of Helf, Walter and Goodrich does not disclose or suggest the particular temperatures, as claimed in claim 46, at which an interlayer and an overlay should be applied. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 46 has not been established.

9. Claim 53

In addition to being novel and non-obvious over the cited references for the same reasons that claim 45 is novel and non-obvious, claim 53 provides additional grounds for patentability. The combination of Helf, Walter and Goodrich does not disclose or suggest performing volumetric testing on a proposed asphalt mixture and then selecting the asphalt mixture for the interlayer after performing and based on volumetric performance of the proposed asphalt mixture, as claimed in claim 53. Further, the cited references alone or in combination do not disclose or suggest **volumetric testing, stability testing, and fatigue testing** a proposed asphalt mixture so as to aid in the design process of making an asphalt mixture, as claimed in claim 53. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 53 has not been established.

10. Claim 54

In addition to being novel and non-obvious over the cited references for the same reasons that claim 45 is novel and non-obvious, claim 54 provides additional grounds for patentability. Helf, Walter and Goodrich also do not disclose or suggest the temperature at which an interlayer can be exposed to temporary traffic, as claimed in claim 54. Further, the cited references do not disclose or suggest the particular temperature claimed by Applicant in claim 54. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 54 has not been established.

11. Claim 55

Helf in view of Walter and Goodrich does not disclose nor suggest making an interlayer for a roadway by forming an asphalt mixture having a Hveem stability at 60°C and 50

[37] See the Blankenship Declaration in Appendix B.

gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains 10Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C, as claimed in claim 55.

As noted by the Examiner, Helf fails to teach measuring stability or fatigue. Further, nothing in Helf suggests that it teaches an asphalt mixture having the high stability and fatigue resistance that are claimed in claim 55. While Walter teaches that stability tests have been performed, [38] Walter does not teach or suggest the specific minimum stability value that is claimed by Applicant in claim 55. While Goodrich teaches that fatigue tests have been performed,[39] it does not teach the specific minimum fatigue resistance values that are claimed by Applicant in claim 55. In fact, the specific minimum stability and fatigue values that are claimed in claim 55 are not even mentioned by any of the cited references. The combination of Helf, Walter and Goodrich does not disclose or suggest an asphalt mixture with a particular minimum stability and a particular minimum fatigue life, as claimed in claim 55.

Further, the cited references are not properly combinable. The Helf invention is concerned with a very unique kind of paving material. The paving material of Helf requires a "flexible aggregate", a term defined by Helf.[40] Walter, on the other hand, is concerned with an asphalt pavement material containing incinerator residue that exhibits sufficient stability. Walter does not even contemplate using "flexible aggregate" in his paving composition and instead suggests the use of mineral aggregates, such as sand, stone, and/or lime. One reviewing Walter would be motivated to look to other references that teach achieving the same goals, such as improving stability or incorporating incinerator waste. As Helf provides no teaching of stability

[38] See Walter at column 9, lines 18-33.

[39] See Goodrich at column 11, line 60, through column 12, line 36.

[40] See Helf at column 5, lines 19-48.

measurements or adding incinerator waste, one looking to improve Walter would have no motivation to look to Helf.

In addition, Goodrich is not concerned with using "flexible aggregate" and in fact does not even mention its use. Instead Goodrich is concerned with making a polymer-modified asphalt that exhibits better performance properties, including a better flexural fatigue life. One trying to improve upon Goodrich would be motivated to look to other references that teach achieving a better flexural fatigue life. As Helf provides no teaching flexural fatigue life, one looking to improve Goodrich would have no motivation to look to Helf.

In addition to the foregoing reasons, neither Walter nor Goodrich would look to Helf to improve its asphalt composition, as both of these references are focused on asphalt compositions and not aggregate composition. Still further, Helf would not look to Walter or Goodrich to improve his "flexible aggregate" invention, as Walter and Goodrich do not even suggest the possibility of using "flexible aggregate" in their paving compositions. Accordingly, there is no motivation from the cited references to modify Helf to suggest Applicant's claimed invention.

In addition, there is no suggestion by Helf or Walter that Walter's base course[41] could be useful in forming Helf's interlayer or surface course, and there is no suggestion by Helf or Goodrich that Goodrich's new asphalt formulation could be useful in forming an interlayer. In fact, Goodrich merely suggests performing a fatigue test to verify the properties of his new chemical formulation and not to design any road layer. [42] Accordingly, there is no motivation to combine Helf, Walter and Goodrich.

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[41] See Walter at column 3, lines 39-46.

[42] See the Abstract of Goodrich.

Still further, one of ordinary skill in the art would not have a reasonable expectation of success in achieving Applicant's claimed invention from the teachings of the cited references. More specifically, one of ordinary skill in the art would not have a reasonable expectation of success in developing Applicant's claimed method of making an asphalt mixture and interlayer using the teachings of the cited references.

Helf teaches away from the present invention by teaching the use of flexible material, such as vulcanized rubber from recycled tire material, in place of traditional aggregate, which can be sand, rocks or other minerals. In doing this, Helf redefines the term "aggregate" in his patent so that this term is not used with its conventional meaning to one of ordinary skill in the art. Helf has been his own lexicographer and has developed the term "flexible aggregate" to mean rubber pieces put in an asphalt mixture. Traditionally, one of ordinary skill in the art would consider the term "flexible aggregate" an oxymoron because aggregate is **not** flexible.

By teaching that an interlayer be made with "flexible aggregate", Helf teaches away from making an interlayer, such as Applicant's interlayer, from merely aggregate in the word's ordinary meaning, namely, rocks, sand or other minerals. This difference is significant. When using substantial amounts of rubber pieces in place of aggregate, an asphalt slurry is created rather than creating a paving layer with good load bearing capacity. One concerned with the stability of the interlayer being created would not look to a reference, such as Helf, that teaches making a slurry.

In addition, Helf teaches away from the present invention by teaching that the same design procedure can be used to make an interlayer or a surface course.[43] By teaching that the designs of an interlayer and a surface course are interchangeable, Helf suggests that there are

[43] See Helf at column 2, lines 8-32, which describes paving a surface or forming a stress absorbing layer with the invented asphalt composition.

not specific performance characteristics, such as stability and fatigue, that one might want to use to develop an interlayer but not a surface course. In fact, none of the cited references teaches designing an asphalt mixture specifically for an interlayer, as done by Applicant. By formulating an asphalt mixture that is specifically for an interlayer, a better design that meets the needs of an interlayer can be made.

The claimed invention is specific to selecting an asphalt mixture for creating an **interlayer** and is not for making other layers of a paved road. One of ordinary skill in the art would have no expectation of making a successful interlayer based on performance tests when no cited reference teaches characteristics that are specific to only an interlayer. The way the asphalt mixture for the interlayer is selected is a key part of Applicant's invention. By using stability and fatigue performance to select an asphalt mixture for making an interlayer, a better interlayer can be created.[44] For the foregoing reasons, one of ordinary skill in the art would not have a reasonable expectation of successfully achieving Applicant's claimed invention from the teachings and suggestions in the cited references.

For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 55 has not been established.

12. Claim 56

In addition to being novel and non-obvious over the cited references for the same reasons that claim 55 is novel and non-obvious, claim 56 provides additional grounds for patentability. The combination of Helf, Walter and Goodrich does not disclose or suggest that the asphalt mixture used to form the interlayer is made from a polymer-modified asphalt binder having a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate when

[44] See the Blankenship Declaration in Appendix B.

using straight-sided molds, as claimed in claim 56. The particular ductility claimed by Applicant is not disclosed or suggested by the cited references. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 56 has not been established.

13. Claim 57

Helf in view of Walter and Goodrich does not disclose or suggest a method of selecting an asphalt mixture for making an interlayer by performing a ductility test on at least one polymer-modified binder and by performing a stability test and a fatigue test on at least one asphalt mixture, as claimed in claim 57. Further, the combination of these references does not disclose nor suggest selecting a binder for making an asphalt mixture based on the ductility of the binder, using this selected binder for making at least one asphalt mixture for performance testing, and selecting an asphalt mixture for an interlayer based on the stability and fatigue performance of the tested asphalt mixture, as claimed in claim 57.

As noted by the Examiner, Helf fails to teach or suggest performing a stability test or a fatigue test. Helf also fails to teach or suggest performing a ductility test on a binder. Walter is cited for teaching that stability tests have performed.[45] Walter also teaches that ductility has been measured.[46] Goodrich is cited for teaching that fatigue tests have been performed.[47] However, neither Walter nor Goodrich suggest the desirability of performing ductility, stability, and fatigue tests within the same design process for selecting an asphalt mixture for making an interlayer, as claimed in claim 57. Out of the numerous performance tests that could be performed, there is no teaching or suggestion by the cited references of performing

[45] See Walter at column 9, lines 18-33.

[46] See Walter at column 9, line 6.

[47] See Goodrich at column 11, line 60, through column 12, line 36.

a ductility test **and** a stability test **and** a fatigue test. There is no suggestion by the cited references that a binder should be selected after performing a ductility test, and there is no suggestion that the selection process should be based on the ductility performance of a proposed binder, as claimed in claim 57. In addition, there is no suggestion that an asphalt mixture should be selected after performing stability and fatigue tests, and there is no suggestion that the selection process should be based on the stability and fatigue performance of a proposed asphalt mixture, as also claimed in claim 57. Goodrich merely performs a fatigue test to verify properties of his new thermoplastic polymer-linked asphalt.[48] Walter merely performs a Marshall stability test to determine a target asphalt content when adding treated incinerator residue but does not suggest stability testing should be integrated into the formulation process when practicing his invention.[49] Walter merely mentions ductility in the context of a physical property of the asphalt cement it is using. Walter does not disclose or suggest using a ductility measurement to aid in selection of a desirable binder for making an interlayer. In fact, neither Walter nor Goodrich suggest performance testing as a design technique for formulating an asphalt mixture when one actually is practicing what is taught by these references. In addition, neither Walter nor Goodrich suggests selecting an asphalt mixture for making an interlayer, as also claimed in claim 57. In fact, neither Walter nor Goodrich even suggest making an interlayer

[48] See Goodrich at column 9, lines 12-32, where uses of his polymer-linked-asphalt reaction product are described, and then see column 10, lines 51-55, which describe that the advantages of this reaction product can be seen from the examples below where various physical properties of the product are measured. The properties being measured are not used as part of an iterative design technique for making the invented product.

[49] See Walter at column4, lines 15-50, which describes that "it has unexpectedly been found that incinerator residue, which has a particle size of less than 2 inches... is highly suitable for replacing about 50 percent or more... of the mineral aggregate in asphalt pavement course compositions."

for a roadway, as claimed by Applicant. Walter's teachings are directed to making a base course[50], and Goodrich's teachings are directed generally to paving and roofing applications.[51]

Further, the cited references are not properly combinable. The Helf invention is concerned with a very unique kind of paving material. The paving material of Helf requires a "flexible aggregate", a term defined by Helf.[52] Walter, on the other hand, is concerned with an asphalt pavement material containing incinerator residue that exhibits sufficient stability.[53] Walter does not even contemplate using "flexible aggregate" in his paving composition and instead suggests the use of mineral aggregates, such as sand, stone, and/or lime. One reviewing Walter would be motivated to look to other references that teach achieving the same goals, such as improving stability or incorporating incinerator waste. As Helf provides no teaching of testing stability or adding incinerator waste, one looking to improve Walter would have no motivation to look to Helf.

In addition, Goodrich is not concerned with using "flexible aggregate" and in fact does not even mention its use. Instead Goodrich is concerned with making a polymer-modified asphalt that exhibits better performance properties, including a better flexural fatigue life. One trying to improve upon Goodrich would be motivated to look to other references that teach achieving a better flexural fatigue life. As Helf provides no teaching of ways to improve flexural fatigue life, one looking to improve Goodrich would have no motivation to look to Helf.

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[50] See Walter at column 3, lines 39-46.

[51] See the Abstract of Goodrich.

[52] See Helf at column 5, lines 19-48.

[53] See Walter at column 3, lines 39-46.

In addition to the foregoing reasons, neither Walter nor Goodrich would look to Helf to improve its asphalt composition, as both of these references are focused on asphalt compositions and not aggregate composition. Still further, Helf would not look to Walter or Goodrich to improve his "flexible aggregate" invention, as Walter and Goodrich do not even suggest the possibility of using "flexible aggregate" in their paving compositions. Accordingly, there is no motivation from the cited references to modify Helf to suggest Applicant's claimed invention.

In addition, there is no suggestion by Helf or Walter that Walter's base course could be useful in forming Helf's interlayer or surface course, and there is no suggestion by Helf or Goodrich that Goodrich's new asphalt formulation could be useful in forming an interlayer. In fact, Goodrich merely suggests performing a fatigue test to verify the properties of his new chemical formulation and not to design any road layer. Accordingly, there is no motivation to combine Helf, Walter and Goodrich.

One of ordinary skill in the art would not have a reasonable expectation of success in achieving Applicant's claimed invention from the teachings of the cited references. More specifically, one of ordinary skill in the art would not have a reasonable expectation of success in developing Applicant's claimed method of selecting an asphalt mixture for making interlayer using the teachings of the cited references.

Helf teaches away from the present invention by teaching the use of flexible material, such as vulcanized rubber from recycled tire material, in place of traditional aggregate, which can be sand, rocks or other minerals. In doing this, Helf redefines the term "aggregate" in his patent so that this term is not used with its conventional meaning to one of ordinary skill in the art. Helf has been his own lexicographer and has developed the term "flexible aggregate" to

mean rubber pieces put in an asphalt mixture. Traditionally, one of ordinary skill in the art would consider the term "flexible aggregate" an oxymoron because aggregate is **not** flexible.

By teaching that an interlayer be made with "flexible aggregate", Helf teaches away from making an interlayer, such as Applicant's interlayer, from merely aggregate in the word's ordinary meaning, namely, rocks, sand or other minerals. This difference is significant. When using substantial amounts of rubber pieces in place of aggregate, an asphalt slurry is created rather than creating a paving layer with good load bearing capacity. One concerned with the stability of the interlayer being created would not look to a reference, such as Helf, that teaches making a slurry.

In addition, Helf teaches away from the present invention by teaching that the same design procedure can be used to make an interlayer or a surface course.[54] By teaching that the designs of an interlayer and a surface course are interchangeable, Helf suggests that there are not specific performance characteristics, such as stability and fatigue, that one might want to use to develop an interlayer but not a surface course. In fact, none of the cited references teaches designing an asphalt mixture specifically for an interlayer, as done by Applicant. By formulating an asphalt mixture that is specifically for an interlayer, a better design that meets the needs of an interlayer can be made.

The claimed invention is specific to selecting an asphalt mixture for creating an **interlayer** and is not for making other layers of a paved road. One of ordinary skill in the art would have no expectation of making a successful interlayer based on performance tests when no cited reference teaches characteristics that are specific to only an interlayer. The way the asphalt

[54] See Helf at column 2, lines 8-32, which describes paving a surface or forming a stress absorbing layer with the invented asphalt composition.

mixture for the interlayer is selected is a key part of Applicant's invention. By using stability and fatigue performance to select an asphalt mixture for making an interlayer, a better interlayer can be created.[55] For the foregoing reasons, one of ordinary skill in the art would not have a reasonable expectation of successfully achieving Applicant's claimed invention from the teachings and suggestions in the cited references.

For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 57 has not been established.

14. Claim 58

In addition to being novel and non-obvious over the cited references for the same reasons that 57 is novel and non-obvious, claim 58 provides additional grounds for patentability. The combination of cited references does not disclose or suggest that the selected polymer-modified binder has a ductility of at least about 10cm, at 4°C on RTFO residue at 5 cm/min strain rate, when using straight-sided molds, as claimed in claim 58. The particular ductility claimed by Applicant is not disclosed or suggested by the cited references. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 58 has not been established.

15. Claim 59

In addition to being novel and non-obvious over the cited references for the same reasons that 57 is novel and non-obvious, claim 59 provides additional grounds for patentability. The combination of the cited references does not disclose or suggest selecting an asphalt mixture for making an interlayer that has a Hveem stability at 60°C and 50 gyrations of at least about 18

[55] See the Blankenship Declaration in Appendix B.

and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C, as claimed in claim 59. As discussed in more detail with respect to claim 55, the particular Hveem stability and Flexural Beam Fatigue claimed in claims 55 and 59 are not disclosed or suggested by the cited references. For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 59 has not been established.

B. A *PRIMA FACIE* CASE OF OBVIOUSNESS BASED ON HELF IN VIEW OF WALTER AND GOODRICH AND FURTHER IN VIEW OF MCDONALD IS LACKING

1. Claim 48

In addition to being novel and non-obvious over Helf in view of Walter and Goodrich for the same reasons that 45 is novel and non-obvious, claim 48 provides additional grounds for patentability over these references and further in view of McDonald. Neither McDonald alone nor in combination with the other cited references discloses or suggests sealing cracks in a roadway before applying an interlayer, as claimed in claim 48. In fact, McDonald does not even suggest making an interlayer and does not suggest sealing cracks before applying his elastomeric pavement repair composition. To the contrary, McDonald teaches applying a hot elastomeric material as a continuous layer to the area to be repaired followed by placing aggregate on the material.[56] For the foregoing reasons, Applicant submits that a *prima facie* case of obviousness for rejecting claim 46 has not been established.

VIII. APPENDICES

Attached hereto are the following appendixes:

Appendix A - Claims on Appeal

Appendix B - The Declaration of Phillip B. Blankenship under 37 C.F.R. §1.132. This declaration was submitted to the Patent Office on June 25, 2004 with a Request for Continued Examination. In the July 12, 2004 Office Action, the Examiner stated that Applicant's submission, which was received by the Patent Office on June 28, 2004, had been entered.

Appendix C - U.S. Patent No. 6,248,396 to Helf

Appendix D - U.S. Patent No. 3,907,582 to Walter

Appendix E - U.S. Patent No. 5,306,750 to Goodrich

Appendix F - U.S. Patent No. 3,891,585 to McDonald

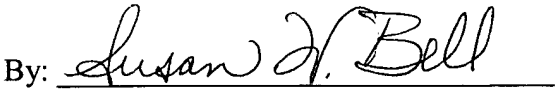
IX. CONCLUSION

In summary, Applicant believes this application is in condition for allowance. The Board is respectfully asked to reconsider the application in light of the foregoing. Applicant submits that pending claims 37-59 are patentable over the cited references and should be allowed.

Enclosed is the appropriate fee in the amount of $500.00 for the filing of this brief. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to deposit account 19-4409.

[56] See McDonald at column 9, lines 18-41.

Respectfully submitted,

By: 

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CLAIMS APPENDIX

37. A method of selecting an asphalt mixture for making an interlayer for a roadway, comprising:

providing at least one asphalt mixture comprised of a polymer-modified binder and aggregate;

performing a stability test on said at least one asphalt mixture;

performing a fatigue test on said at least one asphalt mixture; and

selecting an asphalt mixture for said interlayer after performing said stability and fatigue tests based on stability and fatigue performance of said at least one asphalt mixture.

38. The method of claim 37, wherein said stability test is a Hveem Stability test and wherein said selected asphalt mixture has a Hveem Stability at 60°C and 50 gyrations of at least about 18.

39. The method of claim 37, wherein said fatigue test is a Flexural Beam Fatigue Test and said selected asphalt mixture has a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C.

40. The method claim 37, further comprising:

adding a cross-linking agent to said binder before performing said stability and fatigue tests on said at least one asphalt mixture.

APPENDIX A

41. The method of claim 37, wherein polymer is mixed with said binder under low shear blending conditions.

42. The method of claim 37, further comprising:

prior to said providing step, determining the shear modulus, strain tolerance, and the bending creep stiffness of at least one polymer-modified binder; and

selecting said binder for making said at least one asphalt mixture after performing and based on said shear modulus, strain tolerance and bending creep stiffness measurements.

43. The method of claim 37, further comprising:

prior to said providing step, determining the rotational viscosity of at least one polymer-modified binder; and

selecting said binder for making said at least one asphalt mixture after performing and based on said rotational viscosity measurement.

44. The method of claim 37, further comprising:

performing volumetric testing on said at least one asphalt mixture; and

selecting said asphalt mixture for said interlayer after performing said volumetric testing and based on volumetric performance of said at least one asphalt mixture.

45. A method of reconstructing a roadway, said method comprising:

providing at least one asphalt mixture comprised of a polymer-modified binder and aggregate;

performing a stability test on said at least one asphalt mixture;

performing a fatigue test on said at least one asphalt mixture;

selecting an asphalt mixture for an interlayer after performing said stability and fatigue tests based on stability and fatigue performance of said at least one asphalt mixture;

applying said selected asphalt mixture as said interlayer to said roadway;

determining a desired thickness of an overlay to be applied to said interlayer based on traffic levels; and

applying said overlay to said interlayer in said desired thickness.

46. The method of claim 45, wherein said interlayer is applied at a temperature above about 140°F and is cooled to below about 140°F before applying said overlay.

47. The method of claim 45, wherein said roadway is comprised of Portland Concrete Cement.

48. The method of claim 45, further comprising:

sweeping said roadway; and

sealing cracks in said roadway before applying said interlayer.

49. The method of claim 45, wherein said overlay is at least about 1 inch thick.

50. The method of claim 45, further comprising:

allowing traffic to drive on said interlayer before applying said overlay.

51. The method of claim 45, wherein said overlay is comprised of hot mix asphalt.

52. The method of claim 51, wherein said overlay is further comprised of a SB/SBS polymer modified asphalt binder.

53. The method of claim 45, further comprising:

performing volumetric testing on said at least one asphalt mixture; and

selecting said asphalt mixture for said interlayer after performing said volumetric testing and based on volumetric performance of said at least one asphalt mixture.

54. The method of claim 50, wherein said interlayer is cooled to below about 140°F before releasing said interlayer to traffic.

55. A method of making an interlayer for a roadway, comprising:

forming an asphalt mixture comprised of a polymer-modified asphalt binder and aggregate, said asphalt mixture having a Hveem Stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C; and

forming an interlayer for a roadway from said asphalt mixture.

56. The method of claim 55, wherein said polymer-modified asphalt binder has a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate, when using straight-sided molds.

57. A method of selecting an asphalt mixture for making an interlayer for a roadway, comprising:

performing a ductility test on at least one polymer-modified binder;

selecting a binder for making an asphalt mixture after performing said ductility test and based on said ductility test;

providing at least one asphalt mixture comprised of said selected binder and aggregate;

performing a stability test on said at least one asphalt mixture;

performing a fatigue test on said at least one asphalt mixture; and

selecting an asphalt mixture for said interlayer after performing said stability and fatigue tests based on stability and fatigue performance of said at least one asphalt mixture.

58. The method of claim 57, wherein said selected binder has a ductility of at least about 10 cm, at 4°C on RTFO residue at 5 cm/min strain rate, when using straight-sided molds.

59. The method of claim 58, wherein said selected asphalt mixture has a Hveem Stability at 60°C and 50 gyrations of at least about 18 and a Flexural Beam Fatigue of at least about 100,000 cycles at 2000 microstrains, 10 Hz, about 2-4% air voids, and at a temperature of about 0 to 30°C.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of:	
Inventors: Phillip B. Blankenship et al.	Examiner: Eric B. Fuller
Serial No.: 09/893,314	Group Art Unit: 1762
Filed: June 27, 2001	Confirmation No.: 2106
For: A SYSTEM FOR REPAIRING DISTRESSED ROADS THAT INCLUDES AN ASPHALT INTERLAYER	Docket No.: 506418.0047

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF PHILLIP B. BLANKENSHIP UNDER 37 C.F.R. § 1.132

I hereby declare as follows:

1. My name is Phil Blankenship. I received both a B.S. and a M.S. in Civil Engineering from University of Kentucky in Lexington, Kentucky. The specialty area of my master's degree was transportation materials. I am a registered Professional Engineer in Kansas.

2. I have over 11 years of experience in road paving design and construction. This experience includes over 8 years of industry experience in designing roads and improving paving techniques and about 3 years of government experience with the Kentucky Transportation Cabinet. I am currently a Platform Technology Leader of Koch Materials Company, a subsidiary of the assignee of the above-referenced application. Throughout my career, I have attended numerous continuing education courses relating to the design of pavement systems. I serve on the National Cooperative Highway Research Program review panel for the National Academy of

APPENDIX B

Science. I also serve as a friend of the Transportation Research Board committee on Flexible Pavement Construction and Rehabilitation.

3. I am an inventor of the above-referenced application.

4. I have reviewed U.S. Patent No. 6,248,396 to Helf (Helf), U.S. Patent No. 5,306,750 to Goodrich (Goodrich), U.S. Patent No. 3,907,582 to Walter (Walter), and U.S. Patent No. 3,891,585 to McDonald (McDonald). I also have reviewed the March 25, 2004 Office Action from the Patent Office that cites these references and rejects the claims of the above-referenced patent application.

5. Typically, in order to improve the stability of an asphalt mixture, its fatigue resistance must be sacrificed. In contrast, when improving the fatigue resistance of an asphalt mixture, the stability of the mixture must be sacrificed. Accordingly, it is counterintuitive to test both stability and fatigue as one of ordinary skill in the art would assume that one must be sacrificed for the other. Further, one of ordinary skill in the art would not be motivated to optimize both the stability and fatigue performance of an asphalt mixture for a roadway interlayer, as such characteristics are considered opposite extremes.

6. It is significant that the claimed invention relates to making an interlayer and not a surface layer or a base layer. It is particularly desirable to optimize the stability and fatigue performance of an interlayer. In contrast, for example, a surface layer must have such a high stability that it would not be desirable to try to risk failure in order to improve its fatigue resistance. Accordingly, references such as Goodrich, Walter, and McDonald, which do not suggest making an interlayer, are not analogous art to the claimed invention. One of ordinary skill in the art would not look to these references when trying to improve techniques for making an interlayer.

7. Still further, roads typically are not designed by measuring performance properties of one or more asphalt mixtures before selecting the asphalt mixture to be used for making the interlayer. Further, asphalt mixtures are not typically selected based on the measured performance properties. In addition, the desired performance properties typically are not known before performing the fatigue and stability tests. While performance properties of an asphalt layer have been measured after a pavement layer has been laid, there is no suggestion by Helf, Walter, Goodrich, or McDonald to run performance tests on one or more asphalt mixtures and then select an asphalt mixture for use in paving the road after performing and based on the performance tests.

8. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Phillip B. Blankenship

Date: May 25, 2004